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3. Assembling the 'ageing society'

In the previous chapter, I suggested that to address the challenges of the ageing society, we should focus on developing a conceptual framework that tackles the uncertainty, multiplicity and complexity of the scientific practices and technological processes that sustain it, and that this was best done through an engagement with Science and Technology Studies scholarly corpus. In particular, I argued that both sides of the nexus of ageing and technoscience should be open to investigation, resulting in a programme of research concerned with understanding how distributions of agency are enacted and pragmatically relate to each other. This, in turn, was motivated by the aim to genealogically trace the 'the heterogeneity of what was imagined consistent with itself' (Foucault, 1991: 82): the ageing society. But what is the ageing society, from this knowledge-related, epistemic perspective?

In the introduction, I suggested that the usual answer to this question relates to the social, economic and political consequences that are seen to emerge from changes in population structure. Experts and policy makers disagree about that those consequences are, some viewing it as dictating fundamental changes to the nature of citizenship, while others see it as an opportunity fostering technological and social innovation and creativity. I have further argued that, rather than seeking to assess the rightfulness of each position, there is work to be done in understanding the forms of knowledge, the institutional basis and the normative foundations of each of the arguments. This means that instead of asking for the facts that make the ageing society – its population dynamics, etc – we ask: how, through what means and for what reasons did our societies come to be seen and described as 'ageing societies'. How did the label of 'ageing society' become an authoritative and accepted description of our shared lives, of our present condition and common future? How did it come to be 'gathered in a thing', and what technoscientific practices and processes 'make it exist and maintain its existence' (Latour, 2004: 246)? This is the question this chapter, drawing on the approach previously outlined, aims to address.

Taking as a point of departure key characterisations of the 'ageing society' articulated since the turn of the century, I then outline a genealogy of the relationship between the 'population problem' and economy, articulated explicitly in actuarial sciences in the 19th century, and ultimately in the emergence of State backed social security in liberal democracies. However, I suggest that the ageing society is in fact a questioning of epistemic

infrastructure of the liberal welfare state, a problematization especially evident in the ‘social security crises’ of the early 1980s. As I will demonstrate, those crises were principally about the validity and reliability of expert knowledge, in that they concerned the failure of demographic calculations and economic forecasting to accurately predict increased life expectancies and correlated balances of social security programmes. In the last section of the chapter, I suggest that this recognition of the epistemic but unstable underpinning of the ‘ageing society’ served as the context to re-build a research agenda for the ‘ageing society’ from the 1980s to the present day.

Ageing society at the turn of the 21st Century

Since the turn of the century, the ‘ageing society’ has come of age. This transition was marked by a variety of national and global organisations identifying population ageing as one of the main challenges faced by humanity, along with climate change. The tone was perhaps laid by the United Nations ‘International Year of Older Persons’ in 1999, which, under the theme of the age-inclusive society, marked a shift in ageing policies. Policy markers declared that whereas previous programmes were ‘focusing upon a static age group apart from the rest of the population, efforts [were then being] made to view aging as merely one stage in the course of individuals’ lives’ (Kalache and Kickbusch, 1997:4). This meant that programmes should emphasise the commonalities and interdependencies between older people and the rest of society rather than single out a specific group. In that same year, the European Commission organised a series policy conferences on ‘active ageing’ that also proposed an abandonment of the idea of ‘the elderly’ as a fixed group (Avramov and Maskova, 2004). This political orientation became later crystallised in a comprehensive approach to ageing through a coordination of ‘mutually reinforcing policies’ to tackle ‘the economic, employment and social implications of ageing’. (EC 2002:5). Similar pronouncements, in the same context, were made at the 2005 Whitehouse Conference on Ageing and, in the United Kingdom, by the Science and Technology Committee of the House of Lords following their major review of scientific evidence on ageing (House of Lords, 2005). Ageing was no longer a concern for older people alone.

Indeed, in these policy statements, it is not difficult to identify an emerging consensus about the need to depart from the idea that the ‘problems of ageing’ belonged solely to the elderly. While acknowledging the significance of the challenge brought to bear by

demographic ageing, policy makers and experts appeared to agree that instead ageing, and the 'ageing society', were to be seen as shared, societal problems. As the Secretary-General of the United Nations, Ban Ki-moon put it in a 2012 report published by the UN Population Fund and HelpAge International,

"the social and economic implications of [ageing] are profound, extending far beyond the individual older person and the immediate family, touching broader society and the global community in unprecedented ways". (UNPF/HAI, 2012: i)

With this assessment, the UN Secretary General was advancing the idea that while ageing, and its consequences are most visibly and directly experienced by older individuals and their close social networks -family, friends, etc. -, there are indirect, extensive - but mostly invisible - implications for the wider society, and for what he labelled the 'global community'. There are two key dimensions to this statement.

One relates to the scale of the 'community' that is seen to be affected by demographic ageing. It is not only that the consequences of ageing are society as a whole, but also that this society is now conceived a global entity. According to the same report, although mostly associated with the developed world, demographic ageing is occurring fastest in the developing world. This process, it is argued, further reinforces social, economic and technological inequalities between the Global North and South, as developing countries are growing old before they become rich (Kalache, Barreto and Keller, 2005). Linking the 'ageing society' with the dynamics of the global economy also problematized the ways in which demographic ageing had been framed and managed within national boundaries, and motivated the need to "emphasise the power of knowledge as a policy tool" (Olshanky et al, 2011). This is linked to second dimension of the UN statement.

In a context of global ageing, policy makers argued, it was necessary to create the right epistemic infrastructure to make the implications of the ageing society visible, tangible and actionable. Thus, in Ban Ki-Moon's statement, the link between the individual case and the 'wider society' is tellingly described as 'touching', to connote the fragile, almost imperceptible connection between the two. The difficulty with understanding the 'ageing society' was then more related to the fact that it was not available to immediate experience, to the 'naked eye', so to speak. To realise the link between individual experience of ageing

and its wider, aggregate consequences, it was necessary to draw on a particular type of lens, a particular way of looking at and knowing the ageing process. What are the ways of looking, the knowledge practices and institutions that are so fundamental for the ageing society to be 'gathered as a thing'?

One way to answer this question is to look at how the consequences of population ageing are outlined. To do this, it is perhaps instructive to draw on another report published on that same year by Eurostat – an organ of the European Commission which provides statistical information to the institutions of the European Union. The report summarises the wider societal implications of population ageing as resulting in,

pressure on public budgets and fiscal systems;

strains on pension and social security systems;

adjusting the economy and in particular workplaces to an ageing labour force;

possible labour market shortages as the number of working age persons decreases;

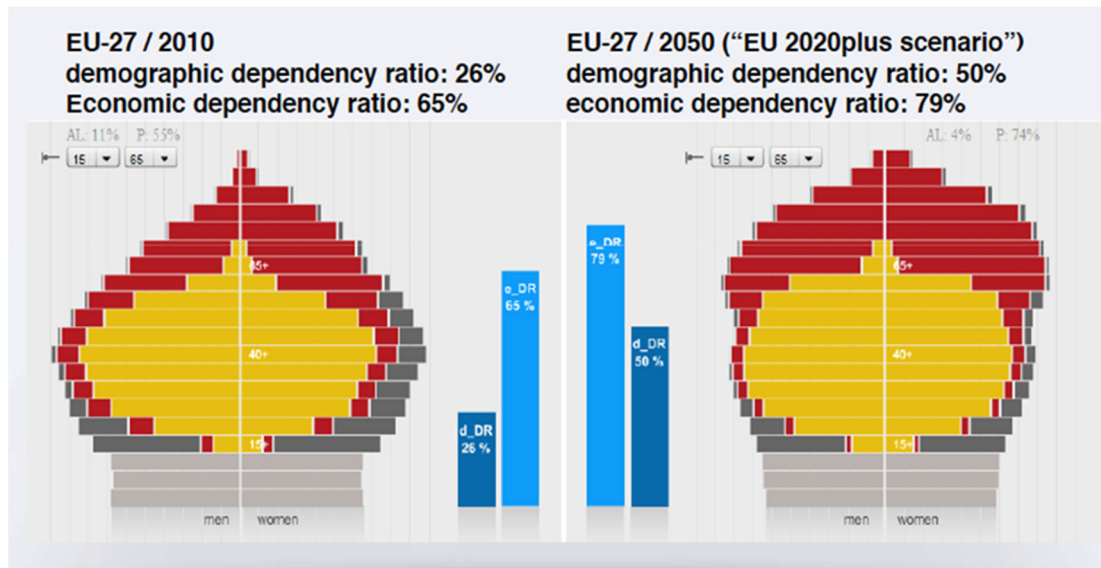
the likely need for increased numbers of trained healthcare professionals;

higher demand for healthcare services and long-term (institutionalised) care;

potential conflict between generations over the distribution of resources.

(Office of the European Union, 2012: 7)

Mostly dealing with what is commonly known as 'facts and figures', the report thus neatly identifies the knowledge domains pertaining to the ageing society: the knowledge of population dynamics (demography), public finances, labour market economics, health and social care, and the socio-economic relations between age groups. One of the most striking aspects of this list is the weight of economic aspects of the ageing society: resources, demand, labour force, markets, budgets, fiscal systems. The report proposes that there is a relationship between the factual reality of population ageing, of the increased proportion of older people in the European population, and the hard reality of economics, of money, markets and budgets. This bond is further evinced in the following graph,



Fritz von Nordheim, reproduced from Lassen and Moreira, 2014

Taken from a presentation by Fritz von Nordheim at a European Active Ageing Conference in December 2012, the graph represents the current and future age pyramid for the 27 countries of the European Union. The age pyramid is a commonly used bilateral histogram that divides the population into gender and age cohorts (See Chpt 4). Its main advantage in comparison with tabular distributions of age groups is that, by its shape alone, it provides the viewer an assessment of the age structure 'at a glance'. Usually, pyramids with larger bases are seen to represent growing, 'younger populations' while constricted pyramids are seen to belong to populations in decline.

In the example provided, to this demographic assessment is added an economic qualification of the population, whereby in each age cohort are nested calculations of the proportions of the active and inactive members of each age group. In the graph, Nordheim, a social scientist specialising in European welfare systems, known for his policy work in the Employment and Social Affairs domain, brings the two dimensions of the 'ageing society' in together. On the one hand, looking at the outlines of the two pyramids, we are able to observe that the European population is expected to age considerably in the next four decades, as the older age groups become more prominent. On the other hand, looking within the age group bars, we become aware of distributions of working capacity within the population between those actively working (yellow), those unemployed but capable of working (grey), those incapable of working (red). From this we quickly glean a relative

increase of the proportion of the population not participating in the labour force. By classifying different age groups in this way, the graph brings to the fore the notion that links demographic ageing and economics: that an ageing population will see a decrease in the number and proportion of active, productive members of a society. This is seen to affect not only the economic efficiency of a nation, but also the distribution of resources across generations, with a smaller proportion of younger, more active members holding more of national income. With current arrangements relating to pensions, social security, and the financing of health and social care, the relative gain in income becomes lost to intergenerational transfers.

One way of tracing the evolution of these transfers as an aggregate is known as the dependency ratio, which calculates the relationship between active members of the population and those receiving any transfer in the form of education, welfare, pensions, etc. While the most widely used dependency ratio includes both individuals below and above 'working age' (15-64 and 65 years), in the context of demographic ageing, experts tend to use the more specific 'old age dependency ratio', which equates only person aged 65 or more in relation to people of working age. On the basis of these premises, Eurostat calculates that in 2010 there were almost 4 persons of working age for every older person (26%), and projects that in 2060 this ratio will be closer to 2/1 (50%) (Eurostat, 2012: 32).

Nordheim's graph above builds on these figures to calculate an even more detailed ratio between population not in the labour force and those actively working: the economic dependency ratio. This more specific ratio attempts to shift the focus from chronological age to the actual working population, regardless of age (See Chpt 5). Curiously, however, instead of projecting a dramatic increase in the dependency ratio in 2050, as the Eurostat proposes for the old-age related calculation, the economic dependency ratio is only expected to rise about a quarter in the next four decades. This is because Nordheim's projection is based on the realisation of adequate pension reforms in the EU member states prior to 2020 - an imagined possibility known as the "EU 2020plus scenario" - whereby there is a consistent postponement of retirement mirroring life expectancy, health and functionality gains in the population (See Chpt 7).

Knowing the series of assumptions, notions and expectations on which the graph relies makes it acquire a different set of meanings. While previously we might have engaged with the graph as an accurate depiction of the evolution of the relationship between demographic ageing and economics in the European Union, now it represents also, perhaps mostly, a proposition in economic policy. What we now see is a particular solution to a problem, a pathway within a number of possible choices. What we now became aware of is that those other possibilities are not available for us to consider. For most of us, this moment of doubt would not last long, returning promptly to the issue at stake and engaging helpfully in trying to support a solution. But what happens if, as this book proposes, we open this moment of doubt and explore the uncertainties within it, if we attempt to dwell in this space of disbelief for long enough to think about the knowledge assumptions of the 'ageing society'. How did we come to frame it almost exclusively by the relationship between demographic ageing and its economic implications? How, of all the possible implications of ageing, did productivity (or 'economic activity'), budgets and transfers come to define the quality of the social relationships that characterise the 'ageing society'?

Outline of a genealogy of the 'ageing society'

To understand the question posed in the previous section, it is necessary, I suggest, to grapple with the key element of the 'ageing society': its population dynamics. In other words, the ageing society is above all a 'population problem'. In his theorisation of governmentality, Foucault describes a contrast between two regimes of power-knowledge and forms of security. In sovereign-type States, territorial authority emanates directly from a central ruler, deployed through strategic knowledge about 'enemies'. In liberal, governmentalized States, power is reliant instead on knowledge and management of populations. Defined as "a global mass affected by overall pressures of birth, death, production, illness" (Foucault, 2003:243), the population is understood through a series of 'dispositifs' focusing on these aspects of the 'mechanics of life'. In particular, it is contingent on the application of methods of data formatting and procedures of statistical analysis that render such mechanisms visible. Of significant relevance, in view of how the implications of the ageing society are imagined by key policy institutions such as the UN, is Foucault's suggestion these that mechanisms are "aleatory and unpredictable when taken in themselves or individually, but which, at the collective level, display constants that are easy,

or at least possible, to establish.” (Foucault, 2003: 246). Issues such as the ‘ageing society’ only can exist at the aggregate, population level.

Also important in Foucault’s conceptualisation of what he labelled the ‘biopolitics of security’ was the concern with the ‘economic’. Statistical measurement and calculations were in this respect considered part of the very apparatus that enabled economic freedom. This is because the governmental regime’s biopolitical technologies were geared toward deploying circulation of the contingent ‘natural flows’ of economic activity, through incentives and deterrents. In this respect, the ‘invisible hand’ of the market works to limit and shape the power of administrative authorities, in that it questions, through its ‘court of veridiction’ (prices, etc), the capacity of government to control individual action (Foucault, 2010 :30). It is from this perspective that it is possible to appreciate Foucault’s now famous definition of governmentality as the “conduct of conduct”. These are forms of knowledge mediated administration that rely on the provision of implements to guide the comportment of individuals, relying thus on individuals’ management of their own conduct through the use of ‘technologies of the self’. For Foucault, these are productive processes, whereby the capacities of rational autonomy and self-determination – the *homo economicus* - are generated in entanglement with enactments of liberal, soft power.

While Foucault has been criticised for his lack of attention to the specificities of statistical reasoning (e.g. Desrosieres, 2008: 101-17), and differences within liberal political economies, his work on biopower provides a useful handle to explore the conjunction between the management of populations and the economy. But to fully realise this we need, as suggested by Tellman (2013) and Dean (2015), to recast the role of the Malthusian ‘problem of population’ in the consolidation of biopower. In *An Essay on the Principle of Population*, Malthus (1792) argued that increases in population would be limited by the more limited capacity to increase food production, or scarcity. Scarcity, he argued, was the key regulatory mechanism in population dynamics, directly shaping the curve of mortality (‘negative checks’) through famine and disease, unless ‘positive checks’ of sexual abstinence and/or abortion were implemented to control population growth. While Foucault focuses on Adam Smith and the *physiocrats* to understand the role of the market and wealth in liberal political economy, Malthus’ work placed, particularly through Ricardo’s work on rent, scarcity at the heart of modern economic reasoning. Such reasoning pervades the listing of

the consequences of the ‘ageing society’ provided by the Eurostat, with its references to ‘pressures’, ‘strains’, ‘shortages’ and ‘conflict’ over resources. As Dean argues, in attending to the Malthusian ‘population problem’, it is possible to understand how “the laws of life are the condition of possibility of economic knowledge” (Dean, 2015: 22).

It is somewhat surprising that Foucault linked scarcity with disciplinary power rather than biopolitical power, given his interest in the development of actuarial science. In his view, “insurance or regularizing technology” was central to the apparatus of governmentality (Foucault, 2003: 222), the notion of population being founded on the epistemological assumption that it possessed its own regularities, “its number of dead, its number of sick, its regularity of accidents” (Foucault, 2009: 107). For Foucault, governmentality was underpinned by “the absolutely capital concept [...] of risk” (Foucault, 2009: 87; Ewald, 1991). As is well recognised, one of the central techniques of capturing these regularities and risks is the life table. This is a tabulation that shows, for each age, the probability of death within a year. It is a fundamental tool both in classical actuarial science, enabling the calculation of insurance rates, and in demography, to determine age-specific life expectancy – and, through this, to make predictions of future age structures, such as the EU27/2050 discussed above.

The importance of the Malthusian ‘population problem’ in both actuarial science and demography is embodied in Gompertz’ Law of Mortality. Gompertz, a practicing actuary working for Select Parliamentary Committees on Friendly Societies in the 1820s, proposed that mortality rates increase in a logarithmic progression (Gompertz, 1825; Kirkwood, 2015). Gompertz’ law is interesting because he decomposed death in two categories: those caused by chance, which would act in a constant, linear manner; and those caused by ‘deterioration, or an increased inability to withstand destruction’ (Gompertz, 1825: 517). Chance death could be seen as representing a normalising transformation of the arithmetic rate governing food production in Malthus’ model, in that it replaced the catastrophic ‘checks’ on population growth by famine and disease (Dean, 2015), by a smooth, unceasing force. Although chance death was excluded in Gompertz’ equation – later reintegrated by Mackeham – his technique enabled a calculation of ‘life contingencies’ that quickly became part of the standard toolkit used by insurance companies. This practice routinely attributed a monetary value - *a worth* - to a specific age.

While the explicit valuation of life was not new in actuarial science, it was bolstered by political legislation to regulate Friendly Societies' role in providing life, burial and sickness insurance for the working class (O'Malley, 2009), which by 1815 covered about one third of English households (Thane, 2000: 194). These reforms, much swayed by Gompertz' work for the Parliamentary Committee (above), required that credentialised actuaries be responsible for the setting of annuities in the Societies. This embedding of actuarial expertise on the cooperative insurance sector aimed to create the tools for incentivising thrift in the emerging industrial labourer population. In this respect, Gompertz' division between chance death and deterioration formalised in actuarial classification the progression from 'savage life' – ensnared by the accidental - to 'civilised life' – characterised by planning and restraint - that is at the heart of Malthus theory of population (Malthus, 1792; Tellman, 2013; Dean, 2015). Indeed, in Gompertz' original paper, accidental and unavoidable death co-existed in his analysis of existing life tables (Hooker, 1965), but the latter modelled the unadulterated process of ageing and death. Given Gompertz admiration for Newton, it can be said that approximation to this ideal was not only closer to natural truth but also to ideal moral worth.

Efforts to professionalise the Friendly Societies insurance schemes continued through the 19th century. They were particularly boosted by the introduction of the first old age pension programme by Bismarck in 1889, which campaigners contrasted with the inadequacies of the Poor Law and Friendly Societies in providing for older people in Britain (Thane, 2000: 198-199). These failures were brought to bear by various surveys of poverty in old age presented to a succession of parliamentary committees on the issue, such as Booth's study of labourers in London. It was uncertain however whether this was due to existing schemes or the lack of planning and restraint by the poor. Proposals for a State-managed old age pension were thus hampered by concerns over its role in discouraging 'providence' amongst the working classes, and, amongst other things, by the Friendly Societies mistrust of a centralised scheme. There was also debate about whether this should become a contributory scheme, as those provided by Friendly Societies, or just reliant on means-testing. When eventually the Old Age Pensions Bill came to parliament in 1908, qualification hinged on a test of demonstrable willingness to work – the 'industry test' – and, importantly, an age limit.

In combining these two qualifying criteria in the administrative management of old age pensions, the British scheme crystallised the two key categories that much later were still to underpin the construction of the EU27 age pyramids analysed in the previous section: activity and age. In this respect, the scheme represents a paradigmatic example of the liberal formatting of the relationship between work and age, also present in the French or German social insurance approach. Crucially, it made actuarial expertise, in calculating present and future life expectancies, essential for the deployment of government budgets. This supports, in relation to old age pensions, Ewald's (1991) claim that the emergence of the liberal welfare state marks their becoming 'insurance societies', in which new social bonds are enacted by insurance underwritten by the State. As Beveridge put it in his report on social insurance after a visit to Germany in 1908, such a 'scheme sets up the state as a comprehensive organism to which the individual belongs' (Beveridge in Hennock, 1987: 136). The use of 'forecasts, statistical estimates and overall measures' of ageing became thus linked to figures on economic growth, employment, taxation income, etc. in the machinery of the State, a tie that would only become more durable with the consolidation of the Welfare state in the next four decades. Ageing became part of what we, after Scott (1998), could label the 'state gaze' on society.

Re-inventing the ageing society

A genealogical exploration of the ageing society clarified how it belongs to the set of population problems enacted by liberal biopolitical regimes. In this process, ageing became a key articulation of the relationship between mechanisms of life and the economy, embodied in the practices of actuarial science. As these were incorporated in the administration of populations by the implementation of old age pensions, it made the collection of data about age, and 'old age' in particular a key activity of emerging welfare states. But these components are not enough to elucidate fully how the 'ageing society' 'gathered as a thing' a few decades later. In the first section, we suggested that ageing society also assembles when the underlying – actuarial - assumptions of programmes such as pension schemes, and health and social care financing are challenged by the process of demographic ageing. The ageing society is, to put it simply, a difference between the actuarial forecast and the contemporaneous reality of the population. This, I will suggest in

this section, is the result of the institutions of 'old age' being captured by another set of sociotechnical relations.

Although there are mentions of the 'ageing society' as far back as the 1930s, for reasons we will explore in the next chapter, it is only in the 1970s that the concept, as we know it today, became established. Key in this process was the publication of the Social Policy, Social Ethics, and the Aging Society Report, by the Committee on Human Development of the University of Chicago. Drawing on a research project that combined the expertise of demographers with that of economists and social policy scholars, the book attempted to examine the 'future of ageing and the ageing society' (Neugarten and Havighurst, 1976: iii). To do this, experts assessed 'present pattern of populations' and crafted 'predictions' to derive consequences for the organisation of health and social services for the 'elderly' in the future. Their assessments and predictions were explicitly labelled as uncertain, as emerging out of novel, unexpected conditions for which it was necessary to create new form of knowledge and expertise.

Indeed, almost a decade later, in what can be considered a direct offspring of the CHD research initiative, the US Committee on an Aging Society, could still state that,

The ways in which an aging society might be a different society, in other than demographic characteristics, are not entirely clear. But it is evident that the changing age distribution of the population will have major implications, at the very least for the following:

- *financing, development, organization, and use of health care systems;*
- *patterns of family life, social relations, cultural institutions, living arrangements, and physical environments;*
- *distribution of jobs among older and younger workers, as well as the earnings, status, and satisfaction that these jobs may provide, within the context of age discrimination laws, seniority practices, and technological innovation;*
- *economic aspects of providing retirement income through various public and private mechanisms;*
- *quality of life of the population throughout the life course including functional status, well-being, legal status, and personal autonomy; and*

- *an ever-shifting agenda of related public policy issues.*

(Committee on an Aging Society, 1985: ii)

One of the striking aspects of this list is its similarity with the EU description of the consequences of the ageing society three decades later, in the other side of the Atlantic. Indeed, the US Committee can be said to have laid the foundations of policy framing of the ageing society. These foundations relied, as one would expect, on a historically amassed collection of forms of knowledge about the ageing process brought to bear by the advent of old age pensions in the liberal welfare state. In the US, this had been instigated through the interest of the Macy Foundation of understanding the implications of Social Security Act of 1935. This in turn had been activated by Vincent Cowdry, then a respect cell biologist, concern about how, in the Great Depression, such programmes sparked potential tensions between functional capacities of older and bureaucratic standards (Park, 2015: 69ff: see also chapters 5, 6 and 9). Brought together by the Macy Foundation with Lawrence Frank (see Chpt 2), they were responsible for organising what was to become the bedrock of gerontology as a field of knowledge: the Woods Hole conference on the ‘problems of ageing’ (Cowdry, 1939; Katz, 1996: 77-103). In particular, it had created a model of social organisation of knowledge – more recently known as multidisciplinary – where different strands of expertise (biology, philosophy, demography, etc.) come together to tackle a shared problem.

While the implementation of this ideal was fraught with difficulties in the next decades (Achenbam, 1995), it is undeniable that it served to frame the composition of the US Committee on an Aging Society, which included physician-scientists - the Nobel-prize winning virologist and paediatrician, Frederik C. Robbins – economists, actuaries, epidemiologists, social scientists but also architects, occupational therapists and lawyers. The remit of the Committee was to collect, review and assess the ‘state of knowledge’ relating to specific areas of concern, such as productivity of older people, health, and the built environment. In so doing, they gathered together the various programmes of ageing research that had been sparked by the Woods Hole conference to examine the present and future of the ageing society. From this perspective, it is significant that the committee’s assessment of this corpus of knowledge is saturated with uncertainty, the nature of the ‘ageing society’ itself not ‘being entirely clear’.

Crucially, this uncertainty relates to the core body of evidence on which the category of the ageing society is built: demography. In their paper reviewing 'demographic trends and projections', Serow and Sly suggest that,

it is important for us to know much more about patterns of mortality and longevity and how these are changing. This may sound simple, but the complexity of such knowledge is evident when we consider that the size of this population is influenced by historical patterns of fertility and mortality to the point at which persons enter old age, as well as by patterns of mortality throughout the older years of life— to say nothing about the patterns of immigration and emigration over the whole course of life. (Serow and Sly, 1988 :43)

Casting research on the demography of ageing as 'relatively recent vintage', Serow and Sly provide an overview of the complex set of variables that enable a calculation of the changing relative size of 'old age' cohorts. Added to this complexity is the sense that the quality of the data and of the techniques used to compute demographic forecasts are uncertain, questioning whether "the knowledge provided by the demography of aging can help policymakers" (Serow and Sly, 1988: 43). Such a precautionary assessment of the capacity of demography to produce accurate and reliable forecasts contrasts with the epistemic authority it emanated within earlier welfare 'insurance societies'. What we encounter instead is a situation where it is 'important to know much more' than previously thought.

The lack of confidence in demographic forecasts is less surprising if we consider that Serow and Fly were writing just a few years after the 'social security crisis' of the turn of the 1980s. This event had publicly questioned the actuarial assumptions upon which old age pensions and other programmes had been established. Kenneth Manton, a prominent US demographer who was a central figure in the public debates on this 'social security crisis', recalls the processes as such:

Before the implications of U.S. population aging became nationally visible in the Social Security "crisis" of 1982 and 1983, there was little analysis of the impact of the growth of the elderly and oldest-old population on national policy.[...] By 1982-1983 it was recognized that increased cohort size and improvements in life expectancy had major implications for Social Security and Medicare. Congressional hearings were held to examine the fiscal implications of fertility and mortality trends and to determine why the trends had not been identified

earlier [...]. The systematic under-projection of the elderly population led the U.S. Senate Finance Committee (1983) to conclude that the official projections had received inadequate scientific input and the uncertainty of projections had been underestimated. (Manton, 1991: 310-12)

As Manton's narrative suggests, the crisis had arisen from the political realisation of the implications of increased life expectancy for the pension provision and health care support for older citizens. Both these systems had been built on the assumption that average life expectancy at 65 years of age would remain more or less constant. There were good reasons for this. From the 1930s until the 1960s, the Medicare decade, a consensus had formed within population scientists and biologists that, as the National Center for Health Statistics would put, "further decreases [in death rate] as experienced in the past cannot be anticipated" (NCHS in Manton, 1991: 311). Such prediction was underpinned by the view that increases in life expectancy had been driven by changes in child health and survival at early ages, but that these gains in life expectancy would not be reflected in the size older cohort because of combination of the arch of development and old age, and a natural 'limit' in human longevity.

Breaking this consensus entailed re-examining the relationship between mortality and morbidity – the quantity and quality of life. In 1980, Fries had strongly reinforced the mainstream view by proposing that gains in prevention of illness would lead to a 'compression of morbidity' against a limit of longevity (Fries, 1980; Fries and Crapo, 1981). This would approximate the curve of mortality to the 'ideal' proposed by Gompertz (above). It also promised a world where, by preventative medicine, time spent living with chronic disease was much reduced. Manton himself had been pivotal in questioning this scenario by arguing that while morbidity might increase in older cohorts, its severity on average would be reduced, leading to gains in life expectancy (Manton, 1982). This was a possible situation where more people were living for longer in lighter states of disability, with obvious implication for planning of social security and health care programmes. Similarly, Olshanky and Ault suggested, a few years later, that the onset of chronic diseases would, through a combination of health technologies and public health, shift to older age groups (Olshanky and Ault, 1985). Finally, there was the prospect that effects of medical technology had done

nothing more than to extend the number of years older people experienced disability (Schneider and Brody, 1983).

In this respect, the controversy was compounding the sense of uncertainty that emerged from the public realisation that 'official projections had received inadequate scientific input'. It was not only that demographic and actuarial calculations became publicly deemed uncertain, it was also that experts could not agree on the instruments and measurements that should be used to evaluate the consequences of 'demographic ageing' on the public purse and the tax payer. It is from this perspective that we can read Serow and Fly's irresolute review of the demographic of ageing. There were observable uncertainties not only about the knowledge base for decision-making but also about the institutional character of knowledge-making procedures: was the administrative apparatus of the State adequate for collecting data related such a complex, unstable object as ageing?, did actuaries, demographers and epidemiologists have the right tools to understand age-specific life expectancy or morbidity?, was there enough funding to understand the 'fixed' and malleable aspects of age-related illness?

A similar 'knowledge crisis' was also emerging in the United Kingdom. Like in the United States with the Reagan administration, Britain had elected a few years earlier a government that wanted to promote economic prosperity through market-driven reforms and re-structuration of public services, including pensions. In this context, the Institute for Fiscal Studies (IFS), an independent think-tank concerned with the financial basis of state administration and social and economic policies, conducted a wide-ranging review of the social security system. Departing from the proposition that "Social Security is 'another British Failure'", Dilnot, Kay and Morris (1984: 1) quickly identified the pension system as the major component of this debacle:

Over the twenty year transition period [since the implementation of the Beveridge Report], costs [of social insurance] would rise by about 25 percent. This increase was wholly attributable to the rising burden of retirement pensions. The number of people of pensionable age was expected to increase from 5.6 million (12 % of the population) in 1941 to 9.6 million [...]. In the event, there were 10.1 million people in this age group in 1971.[...] Although the number of pensioners was to increase markedly in the post-war period, the

number of people of working age was actually expected to fall slightly as a result of the low birth rate between the two world wars. The consequence was that a fixed contribution was to be paid by a declining number of people while demands on the fund were rising (Dilnot, Kay and Morris, 1984: 12-13)

While just focusing on social security, and thus concerned with morbidity and chronic disease in the report, Dilnot and his colleagues could still link the problems experienced by the social security system to weakness in actuarial and demographic forecasts. In the British case, this was not only linked to the fact that the population of pensionable age grew proportionally more than expected, it was also that, because of this relative imbalance, those contributing to the scheme were less than would have been ideal. In other words, the IFS was suggesting that because of this statistical relationship between active and non-active populations, the system was not sustainable. This assessment is usually linked to cut-backs on the State Earnings-Related Pension Scheme (SERPS) by the conservative government in 1986 (MacNicol, 2015: 56).

As it should be apparent by now, we can take the various elements of these ‘social security crises’ as the model and the origin of the ‘ageing society’. Seen from this perspective, the ‘ageing society’ is less about the societal consequences of population ageing, and instead should be viewed as knowledge-related problem. The ‘ageing society’ stands for a concern with ‘knowledge reflexivity’, where there is increased, widespread awareness of the uncertainty of the knowledge base upon which key social and welfare institutions rely. In this respect, the ‘ageing society’ can be seen as part of a wider transformation in contemporary societies in their institutional framing of knowledge processes.

In sociology, these transformations are mainly associated with the emergence of what Beck (1986) labelled the ‘risk society’. Beck, drawing on Luhman and Ewald, proposed that members of the ‘risk society’ experienced a paradoxical combination of increased public awareness of technological, man-made risks and a recognition of depending on the same forms of scientific knowledge to assess, and of technological innovation to solve such risks. However, our analysis shows that, in the case of the ‘ageing society’, it is those technologies of risk assessment and control of contingencies that become problematized. The ‘ageing society’ appears at the confluence of failed past actuarial assumptions and the need to re-

imagine the implications of such failure in the future. In this regard, the 'ageing society' can be said to derive its very existence from the uncertainty of expertise and expert calculations.

For this reason, it is perhaps more useful to focus on this amplification of institutional emphasis on knowledge uncertainty. This is because what appears to characterise the 'ageing society' is not a crisis in public trust about population science or economics, but a process of collective questioning about, of opening the relationship between knowledge making and social institutions, which puts uncertainty at the heart of process. The 'ageing society' corresponds to the social, reflexive process which comes from the collective realisation that,

[c]ontrary to what we might have thought [...], scientific and technological development has not brought greater certainty [but] in a way that might seem paradoxical, it has engendered more and more uncertainty and the feeling that our ignorance is more important than what we know. The resulting public controversies increase the visibility of these uncertainties. They underscore the extent of these uncertainties and their apparently irreducible character, thereby giving credit to the idea that they are difficult or even impossible to master. (Callon, Lacoumes and Barthe, 2009: 18).

Such is the case of the 'ageing society' where controversies about life expectancy and disability in later life compound the already complex business of calculating budgets or transfers across generations. Importantly, the instability of actuarial and demographic forecasts brings into view the delicate foundations of welfare programmes, of the 'insurance society' as we described it in the last section. It opens those up for debate. The 'ageing society' labels the processes whereby members of a society engage in the collective – often conflictual - negotiation about the nature of the link between knowledge and the politics of ageing, enacting and making visible how ageing related expertise relates to normative ideal of living together across the life course.

In proposing this, I am diverging from other understandings of the 'crisis of social security' of the 1980s and 90s, that either see this problematisation as a result of an ideologically driven, neo-liberal attack on the Welfare state or suggest that knowledge uncertainty became a niche opportunity for the implementation of marketization reforms. I do not deny the existence of such drivers in the reform of social security in the last 3 decades. However,

if we depart from an epistemic understanding of the ageing society, the question should be instead focused on the knowledge making institutions that emerged within this ‘age of uncertainty’.

Re-imagining ageing

Recasting the crisis of the ‘insurance society’ as a crisis of knowledge provides a scaffold to explore the nexus between ageing and technoscience. If the ‘insurance society’ had relied on and reinforced models of ageing that enacted ‘old age’ as biological, psychological and socio-economic stage in life (Katz, 1996), for which specific welfare programmes were required, the ‘crisis of social security’ was underpinned by opening up established knowledge on age-related functional decline, disability and life expectancy. As we will see in the remaining chapters of this book, this problematisation did not begin *de novo* in these years, but was instead a parallel formatting of the ageing process, which controversies on demographic forecasts poignantly linked to present and future ways of organising social relations. This connection posed the question: what kind of knowledge and knowledge making institutions do we require to manage the uncertainty that inherent to the ‘ageing society’?

This search for a new framework for knowledge on ageing was evident already in Manton’s proposals to Congress in its hearing on Life Expectancy in 1983, for example. Recognising the irreducible uncertainty of actuarial calculations, Manton recommended the creation of two ‘technical advisory groups’, one concerned with the tools and technologies of forecasting and the other to ‘evaluate epidemiological and biomedical evidence’ of impact of health technologies on mortality and morbidity patterns (Manton in Committee of Finance US Senate, 1983: 61). His proposals are important because they juxtapose the actuarial apparatus to a concern with biomedical and public health research. In imagining this new system of evidence gathering Manton was partially stabilising the list of entities that would be relevant for the ‘ageing society’ as pertaining to longevity, health and dis/ability.

Significantly, it is also within the context of the crisis of demographic forecasts that we see the establishment of the National Institutes of Aging (NIA) in the United States, after many years of failed projects to do so (Lockett, 1983). Seen as a flagship research institution

aiming to coordinate all nationally funded ageing research, the NIA had been set up to provide ‘a comprehensive investigation of the normal, physiological changes with age’ (Butler, 1977: 8). As we will see in Chapter 6, the idea of ‘normal ageing’ had been proposed as a conceptual device to imagine a distinction between avoidable and unavoidable morbidity and disability associated with ageing. Knowing and establishing such ‘standard’ was seen to be a powerful alternative to the ‘arbitrary’ age limit for work, retirement and health care entitlement (Chapter 5). Indeed, as Robert Butler, the first Director of the NIA, put in 1982:

Economic perturbations have threatened the integrity of the Social Security System, [and have motivated] proposals to increase the age of social security eligibility.[...]Because of the increased age of the workforce and conflicts over retirement age [...], we must be able to assess properly the impact of aging on human performance. (Butler 1982:vi)

Butler explicitly describes the ‘social security crisis’ as a period of heightened uncertainty and controversy over retirement age and its relationship with function. His view is that the problematisation of age graded programmes justifies and motivates a research programme on ‘the impact of aging on human performance’. Like Manton, Butler proposed that the key consequence of such debates is a focused research agenda on ageing and dis/ability, to establish what can be legitimately be asked and provided to older people. In so doing, he postpones the collective decision of rising the retirement age, and hinges such choice on future technoscientific research and innovation, a future he hoped would be shaped by the activities of the NIA.

A similar type of imaginary supported attempts to re-organise ageing research in Europe. In France, where neoliberal models had less bearing, the emerging uncertainties about life expectancy and malleability of health and functionality in ‘old age’, most visible in the work of Francois Bourliere, justified the creation of the Unite the Recherches Gerontologiques within the Institut National de la Sante et Recherche Medicale (Lenoir, 1979). In Britain, questions about extended age specific life expectancy and the role biomedicine in this were also central to renewed discussions regarding the - ultimately failed - creation of a NIA-like institute in the United Kingdom (MRC archives).

But nowhere is this imaginary more visible than in the workings of the US Committee on an Aging Society, discussed in the previous section. Their symposia 'did not want to propose national policy but to explore areas of research that might contribute usefully to the weighting of national choices' (Committee on an Aging Society, 1985: vi). These areas were: health and ageing; ageing and productivity; and the role of assistive and 'environmental' technologies in later life. On health, the Committee, in alignment with Manton's proposal of the same year, focused on healthy life expectancy, the possibility of biomedical technology to further it, and the economic scenarios associated with these possibilities. On activity, the Committee chose to complement ongoing work on working life with a specific examination of the role of unpaid activities in older people's wellbeing and wider society (Committee on an Aging Society, 1986). On the built environment, the Committee explored the technological and policy implication of designing housing, transportation and tools to support and enhance older people daily activities (Committee on an Aging Society, 1988; see also Chpt 8).

Health, activity and technology became, through these and other initiatives, the main transversal pillars of contemporary research agendas for the ageing society. It is thus not difficult to identify an affiliation between these early attempt to reduce uncertainty by settle on a set of problems to be investigated, and later, more global pronouncements on the research infrastructure of the 'ageing society'. For example, in the 2007 Research Agenda on Ageing for the Twenty-First Century, already mentioned in the introduction, the UN Programme on Ageing and the IAGG proposed that priorities in research could be decomposed in three key areas. The first aimed to understand the 'productive contribution of older persons [...] to the social, cultural, spiritual and economic 'capital' of all nations' in relation to changing social security provisions and family structures (UN/IAGG, 2007: 3). Second, were issues to do with 'healthy ageing' and how it related to biomedical intervention and public health measures. The third concerned 'ensuring enabling and supportive environments' – physical and social - for active and healthy ageing.

It is possible to think of these three areas as being related through a loosely coupled triangle. To think the 'health' axis, we might want to emphasise how practices of health production and measurement become linked to technoscientific promises of re-composition and regeneration of the ageing body (Moreira and Palladino, 2005; Moreira and Palladino,

2008), and how this might, in some instances, be configured as forms of biocapital (Rose, 2009; Cooper, 2011). Taking work and activity as a point of entry would entail exploring how re-evaluations of the value of labour and its relation with ageing are entangled with health production, on the one hand, and 'supportive environments', on the other (see Chpt 7).

Focusing on technology requires, in the first instance, understanding how through epidemiology and health research relations previously labelled as 'social' – families, friendships, meals, etc. – become qualified as salutary or prejudicial, leading to attempts to instrumentalise and manipulate them. This extension of the range of techniques or interventions blurs, in the case of ageing, the distinctions between biomedicine and public health that have prevailed in other domains (Butler et al, 2008; also Chpt 9).

Technoscientific promises in the domain of ageing offer to modify health and work through a set of converging tools and forms of knowledge that range from the molecular to the sociological.

From this perspective, the 'ageing society' is an assemblage that constrains uncertainties brought to bear with the crisis of actuarial projections. It can be thought of as a way of framing the organisation of knowledge production, technological development and policy formulation that is required by the indeterminate future the 'ageing society' formulates. A measure of its pervasiveness is the fact that the debate between pessimistic and optimistic takes on demographic ageing hinge on differences on the extent and character of the relationship between health, work and technology, and their consequences for economic policy. Further, an indication of its stability as a mode of organising the nexus of ageing and technoscience is that it has remained more or less unchanged for the last three decades. To understand what enabled and sustained the 'ageing society' gathering into a thing, it is necessary to look deeper into the various components within each of the triangular relationship. This will be the main aim of the following chapters.